

Body condition of Everglades' fish and crayfish are differentially affected by hydrology, resources, and competitor density

Jessica A. Klassen and Dale E. Gawlik
Department of Biological Sciences, Florida Atlantic University

Importance of Body Condition

A primary goal of the Comprehensive Everglades Restoration Plan is to improve habitat and functional quality while improving animal species diversity and abundance. One performance measure for this goal is density of freshwater fishes that are prey for wading birds. However, density alone does not provide an accurate measure of habitat quality for freshwater fish. Body condition is an alternate metric that integrates habitat space, food resources, and the individual's ability to acquire suitable habitat and resources. Additionally, fish body condition affects the quantity and quality of caloric energy that can be transferred to higher trophic levels, such as predatory wading birds.

Objective: determine how changing habitat, resources, and competitor density affects fish and crayfish body condition

Fish Sampling and Analyses

- Collected 39,638 fish and crayfish from 237 throw-trap locations from 2005-2011 within the Water Conservation Areas, Everglades National Park, and Big Cypress National Preserve

- Calculated body condition for each individual:

$$\text{Body Condition} = \frac{\text{Body Mass}}{\text{Body Length}}$$

- Akaike's Information Criterion (AIC) to select the best set of predictive models for body condition

- Factors:
 - Habitat → Hydroperiod length (# of days flooded)
 - Resources → Flocculent layer thickness
 - Competitor density → # of total fish in throw-trap

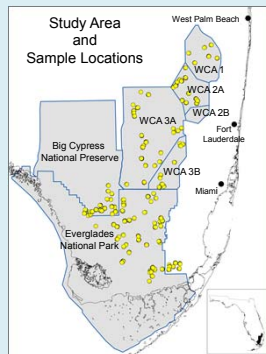
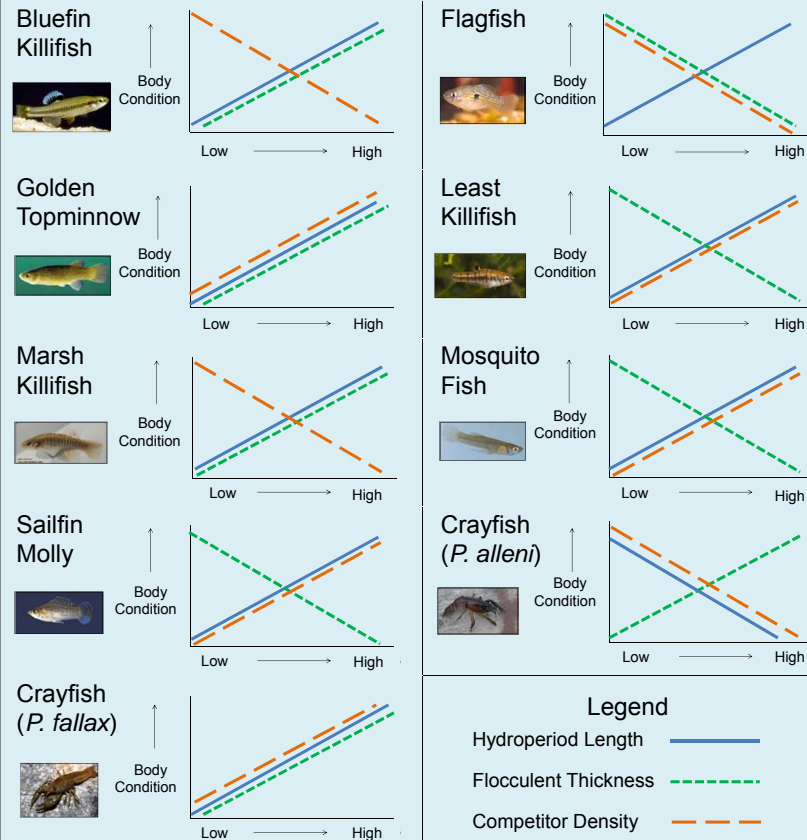
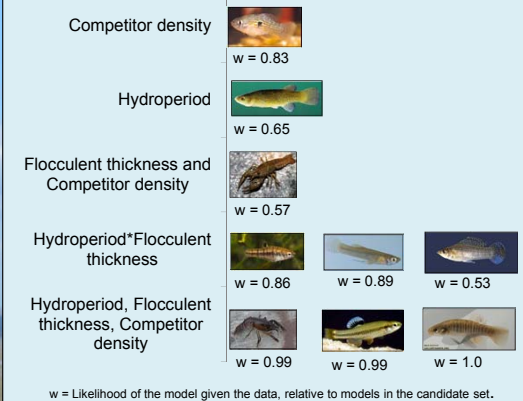


Figure 1. Map of study area. Yellow dots are throw-trap sample locations.

Body Condition Relationships Vary Among Species



Best Predictors of Body Condition by Species



Results and Management Implications

- Hydroperiod affects most species' body condition
- Landscape heterogeneity and disturbance frequency can result in variable body conditions between species in the same location and within species in different locations
- Changes in body condition of aquatic fauna may impact caloric intake and foraging efficiency of predatory animals, such as wading birds

Selected References

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Acknowledgements

Thanks to all field technicians and members of the Gawlik lab for data collection and data management. We also thank the South Florida Water Management District for funding support.

Sampling Fish and Crayfish with Throw-Traps



Figure 2. Researcher throwing a throw-trap.



Figure 3. Researchers clearing a throw-trap of fish.



Figure 4. Fish swept out of a throw-trap with a seine.